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PROCESS ACTION TEAMS - INGREDIENTS FOR SUCCESS

A Graduate Management Project
Submitted to the Faculty of
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Requirements for the Degree
of
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by
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Abstract

The purpose of this study is to evaluate specific predictors of process action team (PAT) success. PAT members who are employees at Madigan Army Medical Center (MAMC) were surveyed with a questionnaire. PAT success items were then correlated with overall PAT success and items above the critical value were selected out. PAT success was measured on a seven point scale by each respondent. Cronbach's alpha for the four items that were selected out was .59. While controlling for background variables and with PAT success as the dependent variable, regression analysis revealed that the four PAT success items accounted for 39% of the variance. This difference in R^2 was tested with an F test [$F(4,18) = 3.57, p < .05$]. The results indicate that PAT success varies as a function of four specific measures of PAT success. This relationship existed even when background variables were controlled. The four significant measures were commitment from upper management, use of a structured problem-solving approach, an appropriate subject matter, and how well the organization was informed about the PATs' efforts and progress.

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Introduction

On 19 October 1992, the Madigan Army Medical Center (MAMC) command group officially began Total Quality Management (TQM) and Continuous Quality Improvement (CQI) efforts at the hospital. At this momentous kick-off, the command's vision statement and overall direction were revealed. Although TQM and CQI efforts were already being informally practiced, the event served as a formal means of conveying to the entire organization that TQM and CQI are not simply the latest fad, but are integral to the continued success of the hospital. More importantly, it demonstrated the command's unified support on this pivotal issue.

The Commanding General, Brigadier General Leslie M. Burger, vocalized a strong desire to see more process action teams (PAT) at work throughout the hospital. PATs are a vital component of any successful TQM program (Berry, 1991). Thus, the success or failure of these PATs can make a tremendous impact on the overall success in implementing TQM and CQI at MAMC.

PATs are appointed to address operational improvement opportunities by investigating and making long-term process improvements (Marszalek-Gaucher and

Coffey, 1990). The teams are commonly composed of members from various departments who have an interest in the process. Although a single member using quality improvement practices can make a big difference, rarely does this single person have enough knowledge and experience to understand everything that goes into a process (Scholtes, 1988). In fact, the IQ of a team has the potential of being much greater than the IQ of individuals (Senge, 1990). Thus, tremendous gains in quality and productivity can result from teams as opposed to individuals.

PATs will frequently use such tools as Pareto charts, histograms, cause-effect diagrams, run charts, control charts and flow charts. PATs are the heart and soul of the quality improvement process and are the mechanism whereby front-line employees have a chance to make process improvements (Marszalek-Gaucher and Coffey, 1990).

Berwick, Godfrey and Roessner (1990) have offered several reasons why PATs can be particularly useful. First, they facilitate dialogue, understanding and knowledge of processes that cross departmental lines. Multi-departmental teams offer the opportunity to improve the whole process rather than just segments of

the process. Second, PATs provide a setting for formal training of employees in quality improvement tools. Finally, PATs and organized team meetings can keep projects on schedule since members create deadlines, set agendas, and foster feelings of shared enthusiasm and mutual obligations. In essence, PATs have value because "teams, not individuals, are the fundamental learning unit in modern organizations" (Senge, 1990, p. 10).

Conditions Which Prompted the Study

MAMC has had several PATs organized by command decree. Others have unofficially formed on the departmental level. However, for both types of teams, no formal guidance on how to organize and operate a successful PAT has ever been given. The literature on PATs suggest that there are key elements which must be present if a PAT is to be effective. Much of the research to support this position is empirically based, and has not been subjected to statistical analysis.

MAMC's PATs are in danger of becoming simply another cliche. For example, when a problem was brought up in a meeting, people were observed to quietly turn to each other and sarcastically say, "Why don't we just form another PAT?" PATs are not taken as

seriously as they should be, and in some circles, it might even be safe to say that PATs are considered to be big jokes. The reason for such cynicism could be attributed to the fact that some PATs have totally failed, while others have failed to achieve lasting improvements.

At Wright Patterson Medical Center (WPMC), senior management ran into similar problems. They thought they would quickly solve all their problems with PATs and have a solution in two weeks (JCAHO, 1992). Needless to say, their initial PATs "failed miserably" (JCAHO, 1992, p. 47).

MAMC's PATs need more guidance and concrete data in order to make them effective and successful in problem-solving. This is absolutely crucial because if the PATs fail, they will lose their credibility as an organized forum for improvement. PATs need to be given the tools, knowledge, and ingredients for success, or they will not receive commitment from team members, and will simply become another TQM cliche.

Statement of the Management Problem

MAMC's PATs have a credibility problem because the teams have not been as successful as they should be. The management problem is to identify predictors of PAT

success and analyze them for their reliability and validity. The predictors can then be used to help PATs become more successful. PAT success will be measured by simply administering a survey and asking respondents how successful they feel their PAT was. This will be measured on a seven point scale with seven being "Extremely successful," and one being "Extremely unsuccessful." Survey respondents are exclusively PAT members.

Review of the Literature

A considerable amount has been written on PATs. After reviewing the literature, it became apparent that several key variables seem to affect PAT success. These independent variables will be discussed in the following paragraphs.

Commitment from upper management is a variable that repeatedly came up in the literature. Marszalek-Gaucher and Coffey (1990) believe that leadership's commitment cannot be emphasized enough. For example, the eventual success of WPMC's use of PATs was due in part to the strong commitment of senior management (JCAHO, 1992). Commitment by upper management is crucial because it reinforces the team's priorities and shows team members that their efforts are valued by the

organization's leaders.

Education in TQM and TQM tools has also been cited as a critical variable. Training targeted to statistical tools and techniques should be provided for PATs (Marszalek-Gaucher and Coffey, 1990). This is needed to help team members use scientifically oriented problem-solving to improve work processes. Berry (1991, p. 72) strongly emphasizes that team members must be "trained, trained, trained, and then retrained." Moreover, training does not necessarily mean a few days in a classroom, but rather a continuous learning process (Berry, 1991). In fact, at WPMC, PATs spend the first two meetings on training - learning team skills, TQM tools, meeting management techniques, and the FOCUS-PDCA (See Appendix A) process improvement approach (JCAHO, 1992).

Berry (1991) states that PATs should function with the advice of a specially trained team facilitator to achieve better results. The facilitator is "an internal quality specialist who serves as a consultant to several quality improvement team leaders" (Berry, 1991, p. 57). A good facilitator should have strong knowledge of the problem-solving process and tools and possess well-developed leadership, communications, and

group dynamic skills (Berry, 1991). Facilitators are instrumental in keeping teams on track, minimizing wasted time and maximizing team results (Berry, 1991). The facilitator's chief responsibilities are to keep the discussion focused and moving along, intervene if the discussion becomes fragmented or tangential, prevent anyone from dominating or being overlooked, and bring discussions to a close (Scholtes, 1988).

PATs should also function under the guidance of an assigned leader who is trained in the quality improvement problem-solving process and in group leadership skills (Berry, 1991). The team leader manages the team, sets up the meetings, handles or assigns administrative details, orchestrates all team activities, and oversees preparations for reports and presentations (Scholtes, 1988). Team leaders also function in a crucial role by managing group conflict and intervening when necessary. Team leaders should be thoroughly familiar with the process being studied.

Marszalek-Gaucher and Coffey (1990) advise against teams larger than ten or twelve people. If necessary, input can be obtained from others who are not on the team. Although Berry (1991) recommends teams that consist of from five to seven people, a decision was

made to use Marszalek-Gaucher and Coffey's guideline because of the complexity and size of most processes here at MAMC.

PATs should be composed of vertical and horizontal cross sections of people (Marszalek-Gaucher and Coffey, 1990). Cross-functional PATs extend the horizons of managers and employees who previously understood only their own local part of the processes involved (Berwick, Godfrey, and Roessner, 1990).

The visible presence of top leaders in a regular role is another important variable. Berwick, Godfrey, and Roessner (1990) state that the value of visible participation of executives has been repeatedly stressed in project reports. The visible presence of top organizational leaders in a regular role includes either reviewing the teams' progress or actually participating on a team. There appears to be no effective substitute for the time of top leaders (Berwick, Godfrey, and Roessner, 1990). Berry (1991) also concurs that leaders must be visible and supportive with regard to PATs.

Berwick, Godfrey, and Roessner (1990) list the regularity of meetings as an important ingredient for success. This is necessary to ensure continuity of the

project and to keep the PATs on track. Irregular meetings may suggest a lack of commitment on the part of members or that the problem is not important enough to warrant regular meetings.

Open dialogue among team members must exist for PATs to succeed (Berwick, Godfrey, and Roessner, 1990). Successful results cannot be achieved if members feel stifled or unable to truly say what they believe. Long-term solutions can only come about when everyone is actively participating and contributing to the problem-solving process.

A process owner is one who can exercise the authority to coordinate improvement and quality control efforts. When a PAT has a process owner, improvement has a better chance (Berwick, Godfrey, and Roessner, 1990). Berry (1991) supports this notion, stating that it is important to make sure PAT members selected for a specific project include one or two people who have the authority, or can easily gain access to it, to implement the solution.

The assignment of team members who have a real stake in finding the right solution has also been proposed as a critical variable. PAT members should be those closest to the problem, so they have a real stake

in finding the right solution (Berry, 1991). These members will have an incentive to implement the chosen solution and see that it sticks because, in the long-term, it will simplify their own work life (Berry, 1991).

Hospital administrators at WPMC armed their teams with a standardized approach to problem-solving after realizing that PATs must utilize a structured problem-solving process (JCAHO, 1992). Berry (1991) also recommends a structured problem-solving process which serves to keep the groups efforts focused and to function as a guide. There are numerous approaches to problem-solving, and although there is no one right method, it is very important for PATs to at least choose one of them to serve as a template for their problem-solving journey.

Selecting the right projects for PATs to pursue is an extremely important matter. If a poor project is selected, the team may become frustrated, demoralized and ineffective (Berry, 1991). Sometimes projects are too broad, data is unavailable, or the problem cannot be measured. Choosing the right projects is absolutely essential.

The availability of one or two statistical

"wizards" is important to team success (Berry, 1991). Many of them will be found in the Resource Management Division, Automation Management Office, Clinical Investigation Division, and Coordinated Care Division. These people can help team members use TQM tools, gather data, and analyze findings. An example of strong diagnostic support that produced highly successful PATs is WPMC. Their management information systems department serves as consultants to PATs and helps team members determine what types of information they may need (JCAHO, 1992).

Berry (1991) strongly recommends special thanks and recognition when a team completes a project, even if it falls short of expectations. Publicizing teams' efforts is equally important. Not only does this encourage others to become team members, but it also shows hospital personnel the real improvements and benefits made by PATs. Celebration is a key method of recognizing the work of PATs. No where is this more evident than at WPMC. The hospital recently had its first TQM Sharing Day where several PATs presented their stories in the hospital auditorium. Other PATs set up storyboards in hallways for the staff to look at (JCAHO, 1992). Not only does this kind of celebration

make team members feel good about the work they have done, but it also encourages others to become involved in PATs and communicates to the entire organization that the teams are truly a mechanism for achieving lasting improvement.

Financial support to pursue the project and implement it is also important. PATs may need financial support to pursue their projects and if red tape ties them up, they may drop all efforts or simply give up (Berry, 1991).

With the best intentions in mind, managers will often propose their solution right away when they hear of a problem (Berry, 1991). This must be avoided because team members will tend to use these solutions as their own in order to please management. This does not mean that management should totally dissociate themselves from PATs, but that they should always remember to offer solutions or recommendations in a nondirective manner (Berry, 1991).

A communications and awareness strategy has also been attributed to PAT success. MAMC is an extremely large organization that cannot expect everyone to be involved with TQM/CQI immediately. As a result, in the beginning, more people will be observing from the

sidelines rather than playing in the game (Berry, 1991). The first PATs plant the seeds of TQM and CQI in the organization (Scholtes, 1988). Therefore, it becomes vital to keep everyone aware of the progress, improvements and benefits. This lack of awareness can be especially devastating because people are already racked with anxiety due to all the change that is taking place within the organization. Berry recommends a communications and awareness strategy that "utilizes the most effective and trusted communications channels to explain and to keep people informed as to TQM's progress and future direction" (Berry, 1991, p. 142)

Finally, physician involvement has been noted as a key factor for PAT success. Physicians are an integral part of any hospital and are vital to many processes. WPMC has recognized this fact and strongly believes physicians should be involved with PATs. Most of their PATs include physicians, which has had a monumental impact on the effectiveness of these teams (JCAHO, 1992).

Purpose of the Study

The purpose of the study is to statistically analyze predictors of PAT success. The hypothesis underlying this project is that the success of PATs

will vary as a function of the 19 independent variables listed above. The null and alternate hypotheses are described in scientific notation below:

$$H_0 : Y = f(x_1 + \dots + x_{19})$$

$$H_a : Y = f(x_1 + \dots + x_{19})$$

The objectives of this study are to conduct a survey of former PAT members, analyze the data, and discuss the results in terms of their impact on PAT success.

The success or failure of PATs will have a major impact on this hospital because they are highly visible efforts (Scholtes, 1988). MAMC must be able to clearly define the elements that contribute to a successful PAT in order for current and future PATs to be effective. If this is not accomplished, PATs may simply be "spinning their wheels," resulting in demoralized team members, wasted manhours, and lost credibility for PATs and TQM in general.

Methods and Procedures

Subjects

The subjects of this study were former PAT members, and therefore, the unit of analysis is a PAT member. Since TQM is so new to MAMC, it was very difficult to find PAT members who had completed their assignment. 30 questionnaires were delivered and 28

were received, resulting in a 93% response rate. This high rate can be attributed to the fact that the questionnaires were personally delivered to all but a few of the respondents.

Survey Instrument

The questionnaire was produced by reviewing the literature. Because no formal questionnaires on PAT success were found, the survey instrument had to be developed from scratch. If the literature noted a variable to be responsible for PAT success, it was included as a question in the survey instrument.

The questionnaire was divided into two sections. The first section consisted of ten background questions, which included a question that required the respondent to rate the level of PAT success. The respondent's rating of PAT success was measured with a seven point scale that ranged from one being "Extremely successful," to seven being "Extremely unsuccessful."

The second section consisted of 21 questions related to PAT success. Six questions were measured dichotomously, while 15 were measured on a seven point scale. A copy of the survey instrument is included in Appendix B.

Procedure

As mentioned above, the questionnaires were personally delivered to respondents. They were told the purpose of the survey and that their response would be greatly appreciated. The only exceptions to this were three questionnaires that were mailed to respondents. Two of them had recently retired and the other one was stationed in Honduras. Aside from these three respondents, the method of hand delivering the surveys was done to standardize the results of the study to the greatest extent possible.

Respondents were made aware of their right to refrain from participating in the study. Additionally, no names, social security numbers, or other type of identifying information was included in the questionnaire. Every effort was made to protect the respondents' ethical rights.

Because of the small sample size, two background questions (education and occupation) were eliminated. Each question had five categories, and therefore, this would have been the equivalent of having ten more independent variables. In addition, another background variable relating to the respondent's experience and knowledge in TQM was eliminated because a question in

Section II on education in TQM was basically measuring the same thing.

Questions 4 and 6 in Section II were deleted as well because they would have to have been analyzed separately from the linear model proposed.

Statistical Methods

The data was entered into one file and a correlation matrix was generated. The 19 PAT items were correlated with PAT success. All items above the critical value of .37 were selected out. Four variables attained this critical level. The purpose for doing this was to eliminate all the items that were not contributing to PAT success.

The critical value was calculated by the Microstat statistical program. If a t-test were to be performed on an item whose correlation coefficient was above the critical value, it would be statistically significant at the $p < .05$ level. In this particular project, items that did not meet the critical value may still have contributed to PAT success, but the contribution was not statistically significant.

Validity was established through criterion validity. A zero order correlation coefficient matrix was generated. The whole premise behind the

establishment of validity is to determine whether or not researchers have measured what they set out to measure. In this study, success is a variable that can be measured according to its varying degrees (seven point scale). If an independent variable correlates with the varying degrees of PAT success, then validity can be established because this independent variable is now a predictor of PAT success.

Cronbach's coefficient alpha was used to assess the reliability, or internal consistency, of the survey instrument. A randomized blocks analysis of variance (ANOVA) table was generated with the 19 independent variables as treatments and the subjects as blocks. Cronbach's coefficient alpha was then computed using the following formula:

$$\text{Coefficient alpha} = 1 - \frac{\text{Mean Square}_{\text{error}}}{\text{Mean Square}_{\text{blocks}}}$$

The linear regression equations and controls used in this study are depicted below:

Restricted Model (background variables)

$$Y = a_0U + b_1X_1 + \dots + b_5X_5 + E$$

Full Model (background and PAT success variables)

$Y = a_0U + b_1X_1 + \dots + b_5X_5 + b_6X_6 + \dots + b_9X_9 + E$, where Y is the dependent measure, b_i , $i = 1-N$, are the raw

least square regression weights, X_i , $i = 1-N$, are the independent variables, and E is the error term.

The dependent variable was regressed upon the independent variables while controlling for background variables. In this case, PAT success was regressed upon all the background variables. After this was done, the four variables that met the critical value for correlation were added into the equation. PAT success was then regressed upon both the background and PAT success variables. Using this model, the background variables were controlled, and therefore, the change in R^2 represents the variance accounted for solely by the four PAT success variables. The difference in R^2 was analyzed with an F test to determine predictive efficiency.

The F ratio for the background items was calculated by using Microstat. However, the F ratio used to analyze the change in R^2 between the background items and the four PAT success items was calculated by hand using the following formula:

$$F = \frac{(R^2_f - R^2_i) / (NLIPV_f - NLIPV_i)}{(1 - R^2_f) / (N - NLIPV_f)}$$

Appendix C contains a more detailed analysis of this equation. The use of this formula was necessary

because the change in R^2 between the background and PAT success items had to be analyzed compared to zero. There was no way this could have been accomplished with Microstat.

Results

The correlations of PAT success with the independent variables are reported in Table 1.

Table 1

Correlations with PAT Success

In the military	.10
Age	.17
Gender	-.13
Supervisory position	.16
Length of time at MAMC	.01
Commitment from upper management	.38
Education in TQM and CQI	.18
Presence of a facilitator	.12
Presence of a team leader	.13
Greater than 12 member team	.14
Cross-functional team	.28
Regular presence of leadership	-.04
Regularity of meetings	.13
Open dialogue	.27
Process ownership	.22
Stake in finding a real solution	.15
Structured problem-solving process	.49
Appropriate subject matter	.44
Diagnostic support	-.19
Celebration and recognition	.15
Financial support	.02
Limited management interference	-.27
Organization informed on PAT efforts	.46
Physician involvement	.15

Critical Value = .37

The results indicate that the use of a structured problem-solving process show the strongest correlation with PAT success.

The descriptive statistics for the PAT success and

background items are contained in Table 2.

Table 2

Descriptive Statistics

Variable	N	Mean	SD
In the military	28	.82	.39
Age	28	42.98	1.68
Gender	28	.61	.50
Supervisory position	28	.89	.32
Length of time at MAMC	28	3.43	3.22
Commitment from upper management	28	4.97	1.68
Education in TQM and CQI	28	3.39	1.31
Presence of a facilitator	28	.57	.50
Presence of a team leader	28	.82	.39
Greater than 12 member team	28	.07	.26
Cross-functional team	28	.96	.19
Regular presence of leadership	28	.57	.50
Regularity of meetings	28	4.96	1.35
Open dialogue	28	5.71	.81
Process ownership	28	5.18	1.33
Stake in finding a real solution	28	5.54	1.00
Structured problem-solving process	28	.67	.47
Appropriate subject matter	28	5.75	1.11
Diagnostic support	28	3.70	1.30
Celebration and recognition	28	3.01	1.60
Financial support	28	1.74	1.24
Limited management interference	28	2.26	1.40
Organization informed on PAT efforts	28	3.77	1.29
Physician involvement	28	4.40	1.52

The mean for commitment from upper management was close to five, which translates to "Committed" on the seven point scale. However, commitment from upper management had the highest standard deviation of the four items that reached the critical value. Thus, the spectrum of ratings for this item was very broad with 68.26% of the respondents' ratings falling into the three to seven range on the seven point scale. Three

was "Noncommitted" while seven was "Extremely committed."

66.6% of the respondents used a structured problem-solving process in their PAT. The highest mean for all items on a seven point scale was for the appropriateness of the subject matter. It also had one of the lowest standard deviations. Most of the respondents felt their PAT's subject matter was either "Appropriate," "Very appropriate," or "Extremely appropriate."

How much others were informed as to the progress and future direction of the PATs had a relatively low mean and an average standard deviation.

Cronbach's coefficient alpha was computed to be .59. Ideally, Cronbach's coefficient alpha should be at least .60. The results indicate that the survey instrument just meets established standards for reliability. The randomized block ANOVA demonstrated that the differences were not due to the items, but to the respondents. There was no statistical significance among the item means, and therefore, the items are homogenous.

The results of multiple regression analysis are shown in Table 3.

Table 3

Regression Analysis with PAT Success as the Dependent Variable

	VAR	R ²	Δ R ²	df1	df2	F	p*
Background items	6	.12	.12	5	22	.58	.72
PAT Success items	10	.51	.39	4	18	3.57	.03*

*Note: * Statistically significant

With PAT success as the dependent variable, the background variables accounted for 12% of the variance. The change in R^2 was tested with an F test and was not found to be statistically significant [$F(5,22) = .58$, not significant]. Adding the four PAT success items to the equation results in an R^2 of .51. Thus, there was a change in R^2 of .39, indicating that the four PAT success items account for 39% of the variance. This change in R^2 was subjected to an F test to determine predictive efficiency. The F ratio value of 3.37 was statistically significant at the $p < .05$ level of probability.

Discussion

The results of this study indicate that PAT success varies as a function of four specific measures of PAT success. In addition, this functional relationship was found to exist even when the effects

due to background variables were controlled.

Therefore, the null hypothesis is rejected in favor of the alternate hypothesis.

Commitment from upper management was one of the variables found to affect PAT success. Demonstration of commitment is critically important. If it is lacking, many will view the total quality process as merely lip service (Marszalek-Gaucher and Coffey, 1990). In this era of diminishing resources and with the call to do more with less, it is pure folly to expect MAMC employees to put their best efforts into a PAT if they believe upper management is not committed to the team.

As noted in Table 2, the mean for this variable was 4.97 (5 = Committed). This result is a little lower than desirable. In fact, less than half the respondents felt that management was either "Very Committed," or "Extremely Committed" to the PATs and its goals. The aim should be to have every PAT member know that management is extremely committed to the team and its goals. This takes on added importance because a lack of commitment to PATs on the part of upper management will undoubtedly lead to a lack of commitment to TQM and CQI at MAMC on the part of its

employees.

The use of a structured problem-solving process was another key variable. Teams that use such an approach have a much easier time arriving at permanent solutions (Scholtes, 1988). Moreover, failure to use such an approach seriously compromises a basic principle of quality improvement and can hinder the PAT's chance for success (Scholtes, 1988).

At WPMC, PAT members all use the same process improvement approach. This approach is called FOCUS-PDCA and stands for the following:

Find a problem

Organize a team

Clarify the process

Understand the process variance

Select an improvement

Plan-**D**o-**C**heck-**A**ct

The FOCUS-PDCA approach is directed at processes rather than individuals. The staff at WPMC believe that clinical processes in particular can be better improved when explored as processes rather than monitored as outcomes (JCAHO, 1992). In this respect,

the FOCUS-PDCA approach provides a clear mechanism to achieve just that.

Memorial Hospital and Health System in South Bend, Indiana, also utilizes a structured problem-solving approach. After evaluating several approaches, Memorial developed its own process improvement model - IMPROVE - which is a combination of Juran's and Shewart's approaches (JCAHO, 1992). Their approach seems to have reaped tremendous success for their PATs. The IMPROVE approach can be described as follows:

Identification - describe present situation, list symptoms or evidence of problems/opportunities, state the opportunity/goal.

Map - chart the process.

Problems - look for complexities, gaps, variance.

Reasons - determine causes, identify root cause.

Options - list alternative solutions.

Venture - plan and implement action to improve, test solutions.

Evaluate - measure results, track improvement, integrate improvements, hold the gain (JCAHO, 1992).

There are many other problem-solving approaches in existence as well. Some have as little as six steps while others have as many as 14 steps. However, all contain basic elements, such as "identifying the issue, collecting data for issue clarification, identifying solutions, selecting a pilot solution, testing the solution, implementation of change, and monitoring to maintain the gain" (JCAHO, 1992, p. 199).

It seems to matter little how many steps one chooses. What is critically important, however, is that PATs use a problem-solving approach containing the basic elements for effective process improvement. The structure of such an approach serves to keep the team focused and also provides strong guidance as to how a PAT should approach a problem. Some problems may seem enormous and intimidating at first glance. A structured problem-solving approach helps PATs to systematically solve a problem a little at a time, step by step. The approach is also useful in that it helps PATs to believe they are actually getting somewhere with the problem. This should minimize the frustration level PATs often face when they don't know how to approach a problem.

Appropriateness of the team's subject matter was

also a predictor of PAT success. Scholtes (1988) proposes some common errors in selecting projects. The first error is to select a process that no one is really interested in or cares about. Studying a process is no simple task, and often the only motivation to sustain the effort is the commitment of team members (Scholtes, 1988). Apathy towards a project will undoubtedly cause it to fail from inattention.

Another common error is to select a desired solution, instead of a process. Sometimes managers will choose a solution to be studied rather than a process because they think they already know what actions need to be taken to improve the process (Scholtes, 1988). Instead of letting the team come up with their own solutions, they tell the team what the results should be. This seriously inhibits the team's creativity and freedom to explore as many alternatives as possible. The best chances for success can only come about when the team as a whole put their minds together to discover the many possible solutions.

A third error is to select a process in transition. Choosing a process that is or will be undergoing transition is a waste of resources

(Scholtes, 1988). For example, MAMC should avoid studying any pharmacy processes until after the Composite Health Care System (CHCS) is in place because CHCS will fundamentally change pharmacy operations.

Selecting a system to study, instead of a process can be another critical error. In their eagerness to gain improvements, managers often select projects that are too ambitious (Scholtes, 1988). Instead of selecting a single process, they select an entire system that is composed of numerous processes. This was a mistake made by MAMC during the initial stages of TQM/CQI implementation. A PAT was formed with a mandate to "fix the patient appointment system." The patient appointment system is one of the most complex systems in the hospital, and therefore, it was not surprising to see the PAT completely overwhelmed with the task at hand. This PAT did not succeed until it got further clarification and began to look at individual processes within the patient appointment system.

Appropriateness also involves the selection of the right team members. Teams are often selected or given problems that are inappropriate to their particular level of responsibility within the organization

(Barger, Hofmann, Shumake, and Daves, 1987). A project can be totally appropriate, but if given to the wrong people to solve, it becomes completely inappropriate.

A key entity for ensuring appropriate projects is the Quality Council (QC). Many organizations have found that PATs should be carefully selected by management. If this is not done, problems arise when all proposed PATs are allowed to form on their own initiative (JCAHO, 1992). In these cases, management may be unable to provide the resources needed to support the team or the resources necessary to implement a chosen solution (JCAHO, 1992).

The QC can alleviate much of the problem by acting as the sole authority whereby PATs are chosen based upon organizational priorities. The QC can also ensure that projects do not conflict with one another or with macro processes within the organization (JCAHO, 1992).

At MAMC, the entity in charge of this function is called the Quality Management Council (QMC). The QMC selects projects based on their importance to the hospital and charters all teams with specific missions. All solutions and recommendations must go through the QMC for approval. The QMC is an essential control mechanism that minimizes wasted resources, rework,

conflict, and frustration or floundering on the part of team members.

Berry (1991) provides additional guidance in selecting projects for PATs:

1. The project should focus on a problem area.
2. The problem should be measurable.
3. Data pertaining to the problem should be available.

4. The project should relate to the needs of internal or external customers.

5. Management must be willing to support the project both financially and in principle.

6. The project needs to be narrowly focused and not so broad that the team gets lost in it.

Another method for ensuring that the projects are appropriate is to formulate a written statement of the teams' job or aim in advance. This statement must not be specific in detail or else it will stifle initiative (Deming, 1986). Getting things down on paper is a good way to test whether or not the project's intent is too verbose or detailed.

The selection of projects for PATs is a very important matter that can impact upon the entire organization. It is, therefore, not surprising that it

surfaced as a very significant variable.

The final significant variable found in this study was the extent to which others in the organization were informed as to the progress and future direction of the PATs. Berry (1991) proposes that awareness and promotion should be handled in a relatively serious manner, but with enthusiasm and a demonstration of long-term commitment. The most constructive way to promote PATS and TQM/CQI is to keep employees aware of their benefits and potential by using the most effective communication channels. Furthermore, management has a tremendous responsibility for continually communicating the progress and successes of PATs because surveys have shown that employees prefer to hear about important matters from their supervisors, upper management, and through department meetings (Berry, 1991).

Internal communication is also important for creating a common understanding and language within the organization (JCAHO, 1992). Storyboards, storybooks, newsletters, and forums are particularly effective in enhancing awareness and fostering increased communication (JCAHO, 1992).

Keeping the organization informed on PAT progress

and its results seems to be important to success for several reasons. First, it may serve as a motivator for PAT members. Having the organization know that they are involved on a PAT and are developing improvements that make a difference can garner commitment from PAT members and encourage them to succeed. Second, keeping the organization informed on the PAT's progress can symbolize commitment on the part of upper management. Finally, it can serve as a reward mechanism by providing recognition to PAT members.

This third reason may seem to conflict with the fact that recognition and celebration as a variable did not produce any significant results. One explanation for this finding may be that recognition and celebration connotes a more overt type of attention that many PAT members may not feel comfortable receiving. For example, MAMC recently completed its first facilitator training course for twelve of its employees. The instructors suggested that all twelve of them go on stage to receive a certificate at the next award ceremony. This suggestion was unanimously rejected by the group. Instead, the twelve preferred to simply stand up in place as a group and just have their training completion mentioned.

While these significant findings reveal much about PAT success, nonsignificance is also worthy of discussion. All of the five background variables were nonsignificant, which alludes to the fact that MAMC may not have to be as selective in choosing team members. Military status, age, gender, supervisory position, and length of time at MAMC seem to be irrelevant factors when it comes to PAT success. What does seem to be most critical is to select team members who are knowledgeable of the vital components of the process being studied.

15 PAT success items were also found to be nonsignificant. In the opinion of the survey respondents, these 15 items were not factors in the success of their PATs. Regardless, the presence of a facilitator and team leader, physician involvement, diagnostic support, etc. may still be important.

Conclusions

The results of this study suggest that PAT success at MAMC is a function of four specific variables. These variables are commitment by upper management, use of a structured problem-solving approach, appropriateness of the project, and keeping the organization informed on PAT progress, future

direction, and success. PATs are so effective in hospital's like MAMC because group problem-solving is generally superior to individual problem-solving when it comes to institutional policies (Liberatore et al., 1989).

The results are clearly relevant for future PATs at MAMC. By concentrating on these four variables, MAMC should be able to increase the effectiveness and success of its PATs. This is extremely important information given the fact that resources will become increasingly scarce throughout the Army Medical Department (AMEDD). Resources should not be poured into areas that have no bearing on PAT success. The results of this study target areas that do need attention and resources if PATs are to succeed. This is where the real utility of the study lies.

The major implication of this study is that manipulation of the four variables can effect positive outcomes for MAMC PATs. This knowledge is particularly useful for the QMC, Command Group, and others who have the power and authority to implement the changes required to improve PAT success.

Data on the statistical analysis of PAT success is virtually nonexistent. If studies have been done, they

were not found in the process of completing a literature review. Although the sample size was small, this study serves as a starting point and reference for further research in this area. It is hoped that the results of this study have shed light on a topic that is critically important to many organizations today. If PATs are to be employed, they should be employed correctly, or not at all. It does an organization more damage than good to have weak, ineffective, or mediocre PATs.

Recommendations

There are numerous recommendations that arise from this study. Keeping the organization informed on the PATs progress and success is a key variable, and therefore, communications becomes an extremely vital issue. The Quality Assurance/Quality Improvement Office at MAMC conducted a survey of hospital employees in the fall of 1992. Among the many questions asked was one that is particularly relevant to this study - "How would you improve communications?" Some of the suggestions were computerized bulletin boards, bulletin boards in high traffic areas, town hall meetings, an improved distribution system, a commander hotline, electronic mail for everyone, newsletters, and brown

bag sessions. Results from this survey are contained in Appendix D.

The feedback from MAMC employees should be reviewed for their feasibility and effectiveness in improving communications within the hospital. The QMC should deal with this issue and actions should then be taken to implement the most beneficial suggestions. It is absolutely necessary to adopt a communications and awareness strategy that utilizes the most effective and trusted communications channels to explain and to keep people informed (Berry, 1991). This would not only improve overall communications within the hospital, but it would also positively affect PAT success.

Since commitment by upper management is so important, it is also recommended that they participate in PATs as well. Managers and staff watch leaders for cues to what is important and valued (Marszalek-Gaucher and Coffey, 1990). Personal involvement can send a very powerful message. In the military environment, people are taught the importance of leading by example. For this very reason, it becomes even more critical for the leadership of this hospital to support PATs through active participation.

To increase commitment from upper management, PATs

should also be formally chartered and followed by the QMC. The QMC at MAMC officially formed in February 1993. This should greatly help the sense of commitment PAT members will feel they are receiving from hospital leaders.

Deciding on the right problem-solving approach for MAMC should help PATs succeed. As mentioned above, there are many variations of a problem-solving approach to choose from. However, what is most important is for MAMC to settle on one, train people thoroughly, and stick to it religiously (Berry, 1991).

The QMC, a task force, or a PAT should investigate this issue to come up with a problem-solving approach suitable for MAMC. This matter would be appropriate for a PAT because a problem-solving approach is actually a process and is not too large of a problem that the PAT can get lost in it.

It is also important for instructors to incorporate the chosen problem-solving approach in facilitator training. Currently, no one approach is being taught and FOCUS-PDCA is only mentioned briefly. Facilitators assist in keeping the group focused on the process of problem-solving. If they are to fulfill their duties, facilitators must be thoroughly familiar

with MAMC's approach.

Since the QMC is the final authority on what projects will be chosen, this committee needs to also know what constitutes an appropriate PAT project. A standard operating procedure (SOP) needs to be developed on the subject. This will not only help the QMC make its decisions, but it will also help the various departments and services know whether or not they should be submitting a PAT for consideration in the first place. Clear guidance on appropriate projects for PATs should decrease the number of inappropriate nominations that go through the QMC. Furthermore, an SOP with broad distribution will let everyone in the organization know what types of issues are appropriate for PATs and perhaps encourage them to bring up problems for which they now have an avenue of resolution.

In the spirit of CQI, it should also be helpful for MAMC to start benchmarking. In its classic form, benchmarking is the technique of searching worldwide for the very best example of a process, product or service, and then setting that standard as a minimum target for improvement (Marszalek-Gaucher and Coffey, 1990). Benchmarking often involves "participating in

comparative data bases, visiting other QI organizations, and studying methods that others use for specific processes to identify opportunities for improvement (JCAHO, 1992, p. 202).

MAMC should benchmark to discover what other PATs are doing and what their organizations are doing to help the PATs succeed. The organizations looked at do not have to be limited to health care institutions, for there are many exciting and innovative activities taking place outside of the health care industry as well. Much can be learned from others and by striving to be the best in class.

Future research should be directed at surveying other medical centers (MEDCENS) and medical department activities (MEDDACS) within the AMEDD. This would allow results to be generalized to the AMEDD. As more and more MEDCENS and MEDDACS institute TQM and CQI, it should become much easier to obtain larger sample sizes.

Another direction for future research to take would be an attempt to develop a more objective measurement of PAT success. This study used a very subjective measurement that has the potential to introduce respondent bias into the results.

One possible suggestion would be to quantitatively track PAT success. Some examples are described below:

- Average waiting time in the pharmacy was reduced by 30 minutes.
- Reduction of the wrong medications rate by 90%.
- Estimated savings of \$200,000 per year in IV supply costs.

This kind of information would be extremely valuable in evaluating the effectiveness of PATs. However, even objective data such as this would contain a degree of subjectivity because the researcher would have to determine what constitutes success and failure. For example, if a PAT generated \$100,000 in savings per year in IV supply costs, how would this be rated on seven point scale? Would \$200,000 be established as the "Extremely successful" point, or would \$150,000 suffice as well? Would only \$1,000 in savings mean the PAT was unsuccessful? Moreover, each PAT would generate different types of benefits that cannot be compared to one another across the board. The potential to utilize objective measurement is definitely there, but it would take an extensive amount of research to make it applicable for statistical analysis.

PATs are vital components of TQM and CQI. If these philosophies are to be established as a way of doing business, PATs must succeed. In fact, the stakes are even higher in the beginning stages of TQM/CQI implementation because people are watching from the sidelines and making judgments everyday based on what they see, hear, and experience for themselves.

Since PATs are so visible, they have the potential greatly influence the success of TQM and CQI at MAMC. Furthermore, if PAT members have bad experiences, this will be communicated to others in the organization and rapidly spread negativity towards the quality improvement effort. In the final analysis, it can ultimately impede or destroy MAMC's efforts to implement TQM and CQI.

This study has found four variables that seem to affect PAT success. It is hoped that action will now be taken to follow through on these results and ensure that these variables become established guidelines for all future PATs at MAMC.

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Appendix A

Abbreviations

AMEDD - Army Medical Department

ANOVA - Analysis of variance

CQI - Continuous Quality Improvement

FOCUS-PDCA - Find a problem
 Organize a team
 Clarify the process
 Understand the process variance
 Select an improvement
 Plan
 Do
 Check
 Act

IMPROVE - Identification
 Map
 Problems
 Reasons
 Options
 Venture
 Evaluate

IQ - Intelligence Quotient

JCAHO - Joint Commission on the Accreditation of
 Health Care Organizations

MAMC - Madigan Army Medical Center

MEDCEN - Medical Center

MEDDAC - Medical Department Activity

NLIPV - Number of linearly independent predictor
 vectors

PAT - Process Action Team

QC - Quality Council

QMC - Quality Management Council

SOP - Standard Operating Procedure

Appendix A (continued)

Abbreviations

TQM - Total Quality Management

WPMC - Wright Patterson Medical Center

Appendix B

Survey Instrument

Process Action Team (PAT) Survey

Section I: Background Data

For the following questions, check the one that applies to you, and fill in the appropriate number of years.

1. Are you in the military?

Yes
 No

2. Age: _____ years

3. Education level

High School degree
 Bachelor's degree
 Some graduate work
 Masters degree
 Doctorate degree

5. Gender

Male
 Female

6. Are you in a managerial or supervisory position?

Yes
 No

7. Occupation

Physician
 Nursing
 Administration
 Other professional
 Other paraprofessional

8. How long have you been an employee at Madigan Army Medical Center? _____ years

(Note: For less than 6 months, put 0 year. For 6 months or more, put 1 year)

Appendix B (continued)

Survey Instrument

9. How would you rate your experience/knowledge level in TQM?
(Check one)

- Extremely low
- Very low
- Low
- Moderate
- High
- Very high
- Extremely high

10. How successful do you believe your PAT was in accomplishing its mission? (Check one)

- Extremely unsuccessful
- Very unsuccessful
- Unsuccessful
- Neither unsuccessful nor successful
- Successful
- Very successful
- Extremely successful

Section II: PAT Data

For the following questions, check the most appropriate answer.

1. How committed was upper management to your PAT and its goals?

- Extremely noncommittal
- Very noncommittal
- Noncommittal
- Neither noncommitted nor committed
- Committed
- Very Committed
- Extremely committed

2. How much education did you receive on TQM and TQM tools before or during your time as a PAT member?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

Appendix B (continued)

Survey Instrument

3. Did your team utilize a trained facilitator?

Yes
 No

4. If you answered "Yes" to #3, how much do you believe the facilitator contributed to the success of your PAT?

Extremely low amount
 Very low amount
 Low amount
 Moderate amount
 High amount
 Very high amount
 Extremely high amount

5. Did your PAT have a team leader?

Yes
 No

6. If you answered "Yes" to #5, how much do you believe the team leader contributed to the success of your PAT?

Extremely low amount
 Very low amount
 Low amount
 Moderate amount
 High amount
 Very high amount
 Extremely high amount

7. Did your team have more than 12 members?

Yes
 No

8. Was your team a cross-functional team (i.e. composed of members from different departments and services)?

Yes
 No

9. Was there a visible presence of top organizational leaders in a regular role?

Yes
 No

Appendix B (continued)

Survey Instrument

10. How regular were your meetings?

- Extremely irregular
- Very irregular
- Irregular
- Neither irregular nor regular
- Regular
- Very regular
- Extremely regular

11. How open was the dialogue among team members?

- Extremely closed
- Very closed
- Closed
- Neither closed nor open
- Open
- Very open
- Extremely open

12. How much ownership did you have in the process being studied?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

13. How high was your stake in finding the right solution?

- Extremely low
- Very low
- Low
- Moderate
- High
- Very high
- Extremely high

14. Did your PAT use a structured problem solving process?

- Yes
- No

Appendix B (continued)

Survey Instrument

15. How appropriate was the project you were assigned to solve?

- Extremely inappropriate
- Very inappropriate
- Inappropriate
- Neither inappropriate nor appropriate
- Appropriate
- Very appropriate
- Extremely appropriate

16. How much diagnostic support (i.e. data gathering, data analysis, information support) did your team receive?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

17. How much celebration and/or recognition did your team receive?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

18. How much financial support did you receive to pursue your project and implement the solution?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

Appendix B (continued)

Survey Instrument

19. How much did management interfere with your team and its efforts?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

20. How much were others in the organization informed as to the progress and future direction of your PAT?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

21. How much physician involvement occurred on your team?

- Extremely low amount
- Very low amount
- Low amount
- Moderate amount
- High amount
- Very high amount
- Extremely high amount

Appendix C

F Test

The F test is a test of the predictability of R^2 . It is a statistical test involving the probability that R^2 attaining an F statistic this large will occur due to sampling fluctuations (due to chance) 99 out of 100 times at this F value. The formula can be described as follows:

$$F = \frac{(r^2_f - r^2_r) / (NLIPV_f - NLIPV_r)}{(1 - r^2_r) / (N - NLIPV_f)}$$

r^2_f = The r^2 value of the full model.

r^2_r = The r^2 value of the restricted model.

$NLIPV_f$ = The number of linearly independent predictor vectors in the full model. $NLIPV$ can also be thought of as the number of estimable parameters.

$NLIPV_r$ = The number of linearly independent predictor vectors in the restricted model.

N = The number of cases or the sample size.

Appendix D

Survey on Communications

Question: How would you improve communications?

14% = computerized bulletin boards/boards in high traffic areas
11% = newsletters/mailers
9% = E-mail (training to all)
9% = mandatory town meetings
5% = supervisor/NCOIC pass on information
5% = computer network throughout organization
4% = closed circuit TV/video
4% = improved distribution system
4% = memo/flyer
3% = PA/intercom system
32% = other (2% or less in each category) to include:

listen to all shifts, panels incorporate all employees, avoid frequent change, everything in writing, voice mail, audio-visual, stress paying attention, promote trickle-up communication, chiefs need to listen to indians, commander hotline, suggestion boxes, provide time for exchange of news, CNN on all TVs, phone system, PAO, hospital information center, inservices, beepers to all staff, radio station, better orientation, better planning/organization, brown bag sessions, hospital MASH party, union stewards, less rumors, phone tree, FAX, teamwork, ward rounds, talk to people vs. memos, monthly calendar of events, representatives from every department at meetings.